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% Andrew Branicki 100973961
% ELEC4700 Assignment 3
% Due March 17, 2019

% Use this code if you wish to run all three functions one after the other.
% The three parts work individually so it might be easier to just run them
% separately.

% clear all
clearvars
clearvars -GLOBAL
close all
clc

PART1
PART2
PART3

disp('Part 3: We can see that the electrons are now struggling to get through the bottleneck,
    since the electric field is pushing them down.')
disp('To make our simulation more accurate, we would need to have a smaller velocity change b
etween time steps.')
disp('Additionally, we could make the resolution of our G matrix much bigger by creating more
bins. This will give us a more accurate E field measurement.')

```

The electric field is calculated to be:
5.0000e+05

The force due to this field is:
8.0109e-14

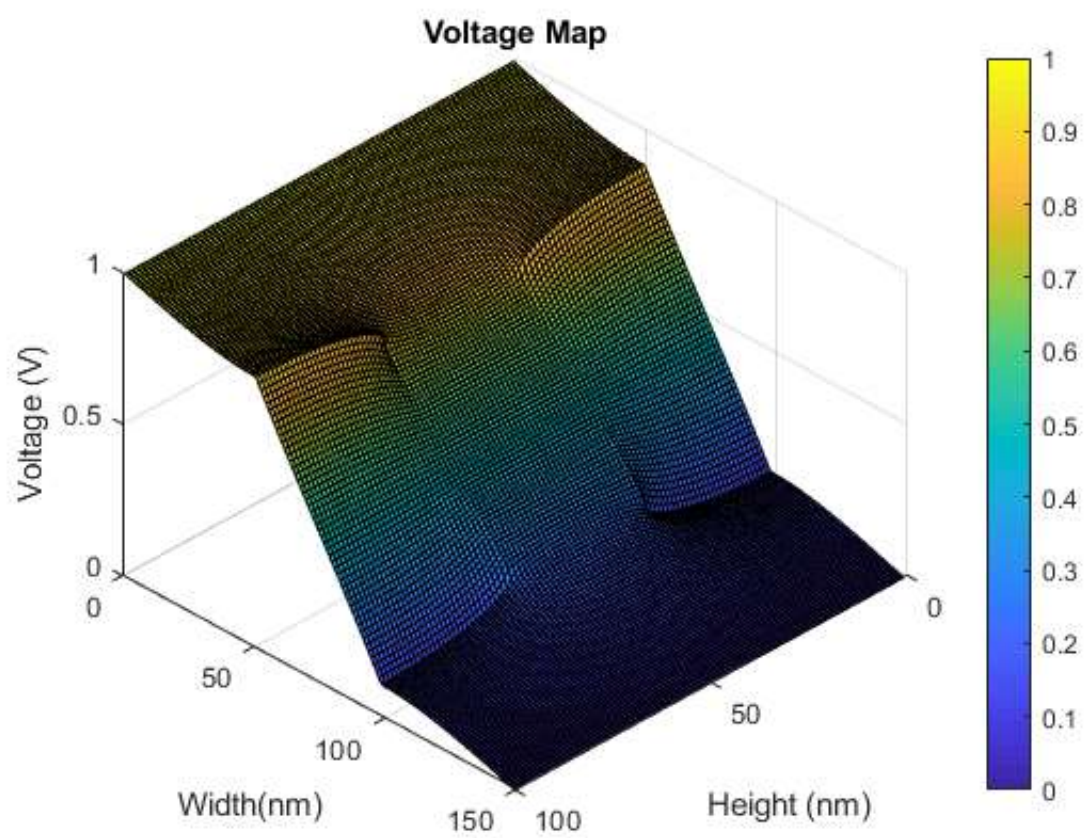
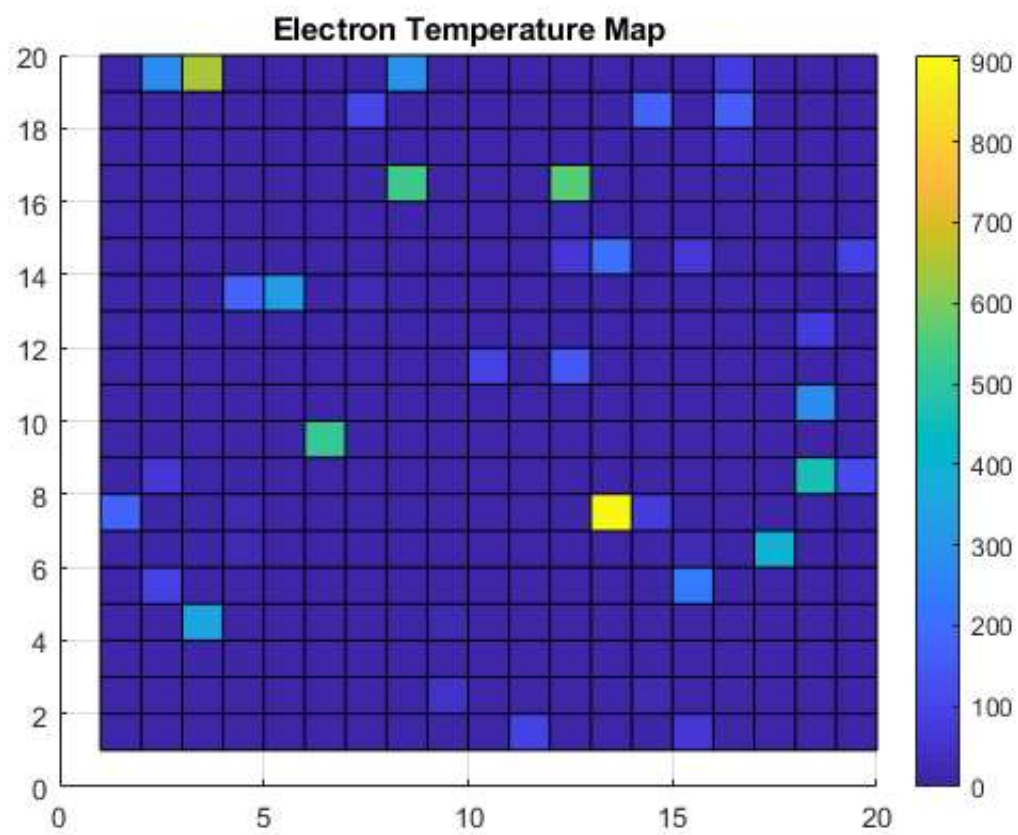
The acceleration due to this force is:
3.3823e+17

The current plot below is calculated using $\text{current} = q_0 * \text{electron concentration} * \mu * \text{electric field} / \text{area}$

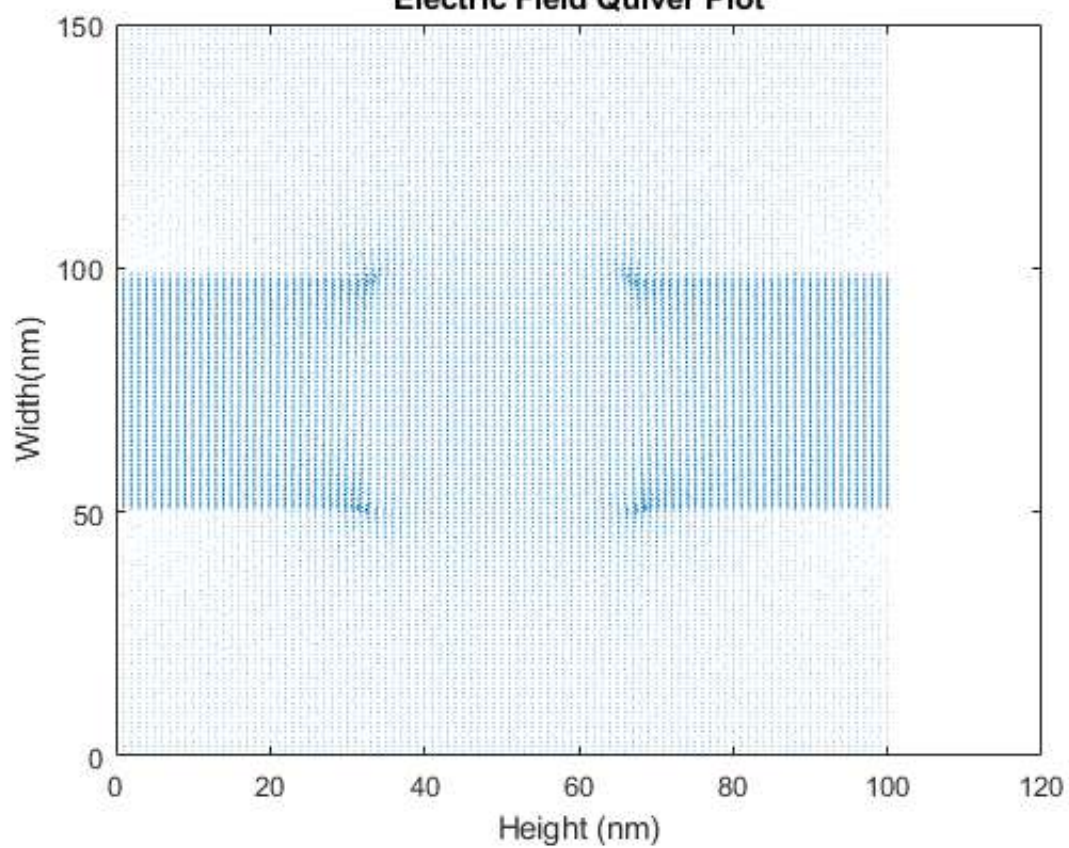
Part 3: We can see that the electrons are now struggling to get through the bottleneck, since the electric field is pushing them down.

To make our simulation more accurate, we would need to have a smaller velocity change between time steps.

Additionally, we could make the resolution of our G matrix much bigger by creating more bins. This will give us a more accurate E field measurement.



Electric Field Quiver Plot



Electron Density Map

