

# Omar Elrefaei

Candidate for BAsC in Nanotechnology Engineering

## CONTACT INFO

### Profiles:

Github  
Linkedin  
Photography blog

### Email:

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- Languages: **Python**, **R**, Bash, **Matlab**, Java
  - Tools: **Linux**, **Git**, Regex, **Numpy**, Matplotlib, **Excel**, SolidWorks (3D design)
  - Technical skills: PC Hardware, Circuits, Soldering
  - Material science: **Tensile testing**, **Fabrication design**, Crystalline structure,
  - Chemistry: **Equilibrium stress and yield**, Entropy and Enthalpy calculations,
  - Mathematics: Multi-Variable calculus, Curve fitting, Taylor series
  - Computation: **Data analysis & visualization**, **Linear algebra**, Taylor approximations, Numerical differentiation
- Some knowledge about Photonics, Nanoparticles, and Quantum properties*

## PROJECTS

### Automated Material Analysis – R

<https://github.com/Omar-Elrefaei/small-projects/tree/master/material-science>

- Analyzed material properties with data gathered from **Tensile tests**.
  - **Graph** 'Stress vs Strain' and 'Load vs Elongation'
  - Calculate 'Young's Modulus', 'Percent Elongation' among other properties
- Generalized the process to re-calculated everything for a new material just by gathering a new set of data.

### Kinematics – Python

<https://github.com/Omar-Elrefaei/kinematics>

*Your Swiss Army Knife for all your projectile problems.*

- Used Python and 'matplotlib' to calculate and plot the path of a projectile
- Learned more about the whole **software design cycle**: Design, prototype, execution, iteration, testing.
- The project was properly designed before implementation: **Algorithm design**, pseudo code
- Gained resilience for working under pressure, as I had to meet a deadline in 9 hours

### DynamicSheets – Java

<https://github.com/Omar-Elrefaei/DynamicSheets>

*A CLI spreadsheet program*

- Carefully designed user interactions for data input
- Searching and Sorting multi-dimensional arrays
- Accelerated testing time (saved 10min/hour) by automating test input in DynamicSheets using an AutoHotKey script.

### A Map for Regulating Gene Editing – Research paper

<https://github.com/Omar-Elrefaei/High-School-Research-A-Map-for-Regulating-Gene-Editing>

A research project exploring how can we best regulate Gene-Editing research and application especially in the sight of new technologies like CRISPER. The paper referenced previous scientific and regulatory research, quoted renowned experts, and made analogies with history for the betterment of the future

### PDF Word Search – Shell scripting

Used CLI tools to:

- extract text from a PDF
- search in the text for a predefined list of words
- output the page and line numbers of matches

### Remotely controlled Thermostat – Arduino, C++

Created an IR controlled thermostat, by modifying a manual one using: Arduino, IR receiver, and a rotor.

### Pronunciation of Arabic letters app – Android SDK, Java, AWK

- Created a mobile app to help children practice pronouncing Arabic letters at home.
- Saved +3 hours by automating the creation of a grid buttons using a AWK.

## VOLUNTEERING

### University of Waterloo

#### Elected Academic Representative

- Made sure a continuous line of communication was always open between students and profs.

SEPT 2019 - DEC 2019