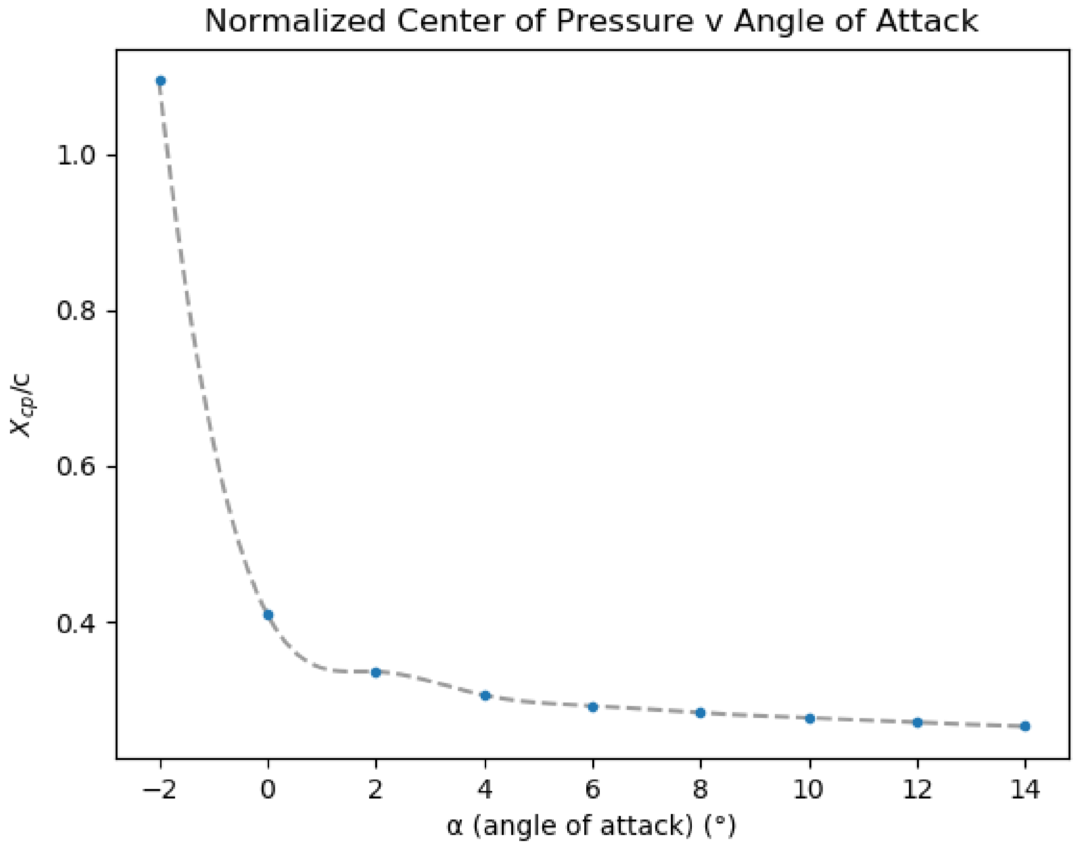

From the graph, the center of pressure moves back along the airfoil as the angle of attack increases, starting behind the airfoil (since its normalized, you can think of the y-axis as plotting the center of pressure location as a percentage along the chord line) trending towards the front of the airfoil, approaching an asymptote of ~ the quarter chord. From the Anderson Textbook, page 92, it is noted that the center of pressure location moves forward as the angle of attack is increased and that this location is always behind the quarter-chord point for finite positive values of cl.

Appendix A: Python Code

```
import numpy as np
import matplotlib.pyplot as plt
import math
from scipy.interpolate import make_interp_spline, BSpline

alpha = np.array([-2.0,0.0,2.0,4.0,6.0,8.0,10.0,12.0,14.0])
c_l = np.array([0.05, 0.25, 0.44, 0.64, 0.85, 1.08, 1.26, 1.43, 1.56])
c_d = np.array([0.006, 0.006, 0.006, 0.007, 0.0075, 0.0092, 0.0115, 0.0150, 0.018
6])
c_mc_4 = np.array([-0.042, -0.040, -0.038, -0.036, -0.036, -0.036, -0.034, -
0.030, -0.025])


c_n = np.array([])
for i in range (0, len(c_mc_4)):
    x = c_l.item(i)*np.cos(math.radians(alpha[i]))+c_d.item(i)*np.sin(math.radian
s(alpha[i]))
    c_n = np.append(c_n, [x])

x_cp_c = np.array([])
for i in range (0, len(c_mc_4)):
    y = 1/4-c_mc_4.item(i)/c_n.item(i)
    x_cp_c = np.append(x_cp_c, [y])

x_new = np.linspace(-2,14,300)
spl = make_interp_spline(alpha, x_cp_c, k=3)
y_new = spl(x_new)

plt.plot(x_new,y_new, "--", alpha = 0.4, color = 'black')
plt.plot(alpha,x_cp_c, ".")

plt.xlabel("\u03B1 (angle of attack) (\u00b0)")
plt.ylabel("$X_{cp}$/c")
plt.title('Normalized Center of Pressure v Angle of Attack')

plt.savefig("Problem 1.6.png")
```