Group Name: Innovators **Group 9**

ML+CV Combined Project: Cell Segmentation

Group Members:

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Tasks Performed

- Worked on implementing the mish and Gated Swish functions in our U-Net model

Mish –

In [16]:
```
class Mish(tf.keras.layers.Layer):
    def __init__(self, **kwargs):
        super(Mish, self).__init__(**kwargs)

    def call(self, inputs):
        return inputs * tf.math.tanh(tf.math.softplus(inputs))
```

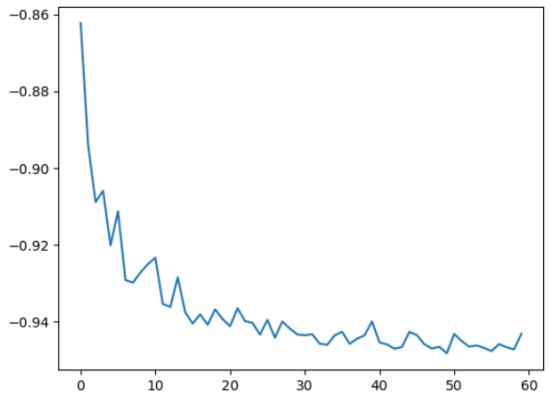
In [46]:
```
cb = TimingCallback()

UNet_5 = UNet((96, 96, 3), activation_= Mish())
model5 = UNet_5.buildModel()
UNet_5.CompileandSummarize(model5)
results5 = model5.fit(x = X_train, y = Y_train, batch_size = 8, epochs=150, callbacks = [cb, tf.keras.callbacks.EarlyStopping(monito
r='val_loss', patience=10)], validation_data = (X_test, y_test))

training_inferences['Mish'] = sum(cb.logs)
```

In [47]:
```
plt.plot(results5.history['val_loss'])
```

Out[47]:
```
[<matplotlib.lines.Line2D at 0x7efe38e09590>]
```



Gated Swish –

In [17]:
```
from tensorflow.keras.layers import Layer

class gated_swish(Layer):

    def __init__(self):
        super(gated_swish, self).__init__()

    def call(self, inputs):

        """
        Gated Swish activation function.
        """
        gate = tf.math.sigmoid(inputs)
        activation = tf.nn.swish(inputs)

        return gate * activation
```

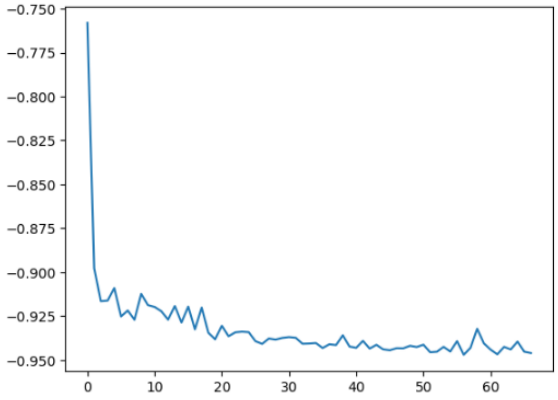
In [51]:
```
cb = TimingCallback()

UNet_6 = UNet((96, 96, 3), activation_= gated_swish())
model6 = UNet_6.buildModel()
UNet_6.CompileandSummarize(model6)
results6 = model6.fit(x = X_train, y = Y_train, batch_size = 8, epochs=150, callbacks = [cb, tf.keras.callbacks.EarlyStopping(monito
r='val_loss', patience=10)], validation_data = (X_test, y_test))

training_inferences['gated_swish'] = sum(cb.logs)
```

In [52]:
```
plt.plot(results6.history['val_loss'])
```

Out[52]:
```
[<matplotlib.lines.Line2D at 0x7efdf264d350>]
```



Outcomes

Compared and understood how different activation functions affect validation loss

Tasks to perform in upcoming weeks

- Finish up with the remaining activation functions
- Conduct rigorous comparison of activations functions