CLAIMS

What is claimed is:

~~1.~~ 1. A downhole tool comprising:

a collar;

an insert disposed within the collar;

an electronic control unit (ECU);

a vibration sensor in communication with the ECU;

a voltage source in communication with the ECU; and

an electroactive polymer (EAP) ~~disposed~~extending along ~~portions~~a circumference of the ~~collar~~insert, the EAP in communication with the ECU, wherein the ECU is configured to apply voltage to the EAP based on signals received from the vibration sensor.

~~2.~~ 2. The downhole tool of ~~claim~~ claim 1, wherein the collar comprises threads on opposing ends, wherein the EAP is disposed on the threads to dampen at least torsional vibrations.

~~3.~~ 3. The downhole tool of ~~claim~~ claim 1~~, further comprising an insert disposed within the collar~~, wherein the EAP is disposed between the collar and the insert to dampen at least lateral vibrations.

~~4.~~ 4. The downhole tool of ~~claim~~ claim 3, wherein the EAP is further disposed on an end of the insert to dampen at least axial vibrations.

~~5.~~ 5. The downhole tool of ~~claim~~ claim 4, wherein the insert includes an electronic component.

~~6.~~ 6. The downhole tool of ~~claim~~ claim 1, further comprising a shoulder, wherein the EAP is disposed on the shoulder to dampen at least axial vibrations.

~~7.~~ 7. The downhole tool of ~~claim~~ claim 1, wherein the voltage source comprises a thermoelectric generator configured to convert downhole heat into electricity.

~~8.~~ 8. The downhole tool of ~~claim~~ claim 1, wherein the voltage source comprises a vibration-powered generator configured to convert downhole vibrations into electricity.

~~9.~~ 9. A downhole dampening system comprising:

a drill string; and

~~———~~a downhole tool comprising:

~~———~~a collar;

an insert disposed within the collar;

an electronic control unit (ECU);

a vibration sensor in communication with the ECU;

a voltage source in communication with the ECU; and

an electroactive polymer (EAP) ~~disposed~~extending along ~~portions~~a circumference of the ~~collar~~insert, the EAP in communication with the ECU, wherein the ECU is configured to apply voltage to the EAP based on signals received from the vibration sensor.

~~10.~~ 10. The downhole dampening system of claim 9, wherein the collar comprises threads on opposing ends, wherein the EAP is disposed on the threads to dampen at least torsional vibrations.

~~11.~~ 11. The downhole dampening system of claim 9~~, further comprising an insert disposed within the collar~~, wherein the EAP is disposed between the collar and the insert to dampen at least lateral vibrations.

~~12.~~ 12. The downhole dampening system of claim 11, wherein the EAP is further disposed on an end of the insert to dampen at least axial vibrations, wherein the insert includes an electronic component.

~~13.~~ 13. The downhole dampening system of claim 9, further comprising a shoulder, wherein the EAP is disposed on the shoulder to dampen at least axial vibrations.

~~14.~~ 14. The downhole dampening system of claim 9, wherein the voltage source comprises a thermoelectric generator configured to convert downhole heat into electricity.

~~15.~~ 15. The downhole dampening system of claim 9, wherein the voltage source comprises a vibration-powered generator configured to convert downhole vibrations into electricity.

~~16.~~ 16. A method to dampen vibrations in a downhole environment, the method comprising:

receiving vibration information; and

activating an electroactive polymer (EAP) ~~disposed~~that extends along ~~portions~~a circumference of a downhole tool, based on the vibration information, the downhole tool comprising:

~~———~~a collar;

an electronic control unit (ECU);

a vibration sensor in communication with the ECU; and

a voltage source in communication with the ECU, wherein the ECU is configured to apply voltage to the EAP based on signals received from the vibration sensor.

~~17.~~ 17. The method of ~~claim~~ claim 16, further comprising dampening at least torsional vibrations, wherein the collar comprises threads on opposing ends, wherein the EAP is disposed on the threads.

~~18.~~ 18. The method of ~~claim~~ claim 16, further comprising dampening at least lateral vibrations, wherein an insert is disposed within the collar, wherein the EAP is disposed between the collar and the insert.

~~19.~~ 19. The method of ~~claim~~ claim 18, further comprising dampening at least axial vibrations, wherein the downhole tool further comprises a shoulder, wherein the EAP is disposed on at least the shoulder or an end of the insert.

~~20.~~ 20. The method of ~~claim~~ claim 16, further comprising generating voltage with the voltage source, the voltage source comprising at least a vibration-powered generator or a thermoelectric generator.