CLAIMS:

~~1. An actuator array comprising:~~

~~an elongate base, wherein the elongate base comprises a pliant and inextensible material; and~~

~~a plurality of pneumatic actuator elements removably attached to the elongate base, wherein the pneumatic actuator elements are configured to be inflated and thereby to interfere with each other in use to generate a bending motion supported by the elongate base; and~~

~~wherein at least one parameter associated with the pneumatic actuator elements is selected to control a three-dimensional (3-D) profile of the bending motion.~~

~~2. The actuator array as claimed in claim 1, wherein the at least one parameter comprises relative sizes of adjacent pneumatic actuator elements.~~

~~3. The actuator array as claimed in claim 1 or 2, wherein the at least one parameter comprises shapes of adjacent pneumatic actuator elements.~~

~~4. The actuator array as claimed in any one of the preceding claims, wherein the at least one parameter comprises a spatial distribution of the pneumatic actuator elements on the elongate base.~~

~~5. The actuator array as claimed in any one of the preceding claims, wherein the at least one parameter comprises relative elasticities of adjacent pneumatic actuator elements.~~

~~6. The actuator array as claimed in any one of the preceding claims, wherein the pneumatic actuator elements are independently operable.~~

~~7. The actuator array as claimed in claim 6, wherein each pneumatic actuator element comprises a respective valve for controlling an inflation pressure.~~

~~8. An exoskeleton comprising at least one actuator array as claimed in any one of the preceding claims, wherein the exoskeleton is configured to be mounted to a user to generate a continuous 3-D trajectory.~~

~~9. The exoskeleton as claimed in claim 8, wherein the pneumatic actuator elements are configured to generate the bending motion adjacent a joint of the user and substantially no bending motion along a body or limb section of the user.~~

~~10. The exoskeleton as claimed in claim 8 or 9, comprising at least two actuator arrays connected in series.~~

~~11. The exoskeleton as claimed in claim 8 or 9, comprising at least two actuator arrays connected in parallel.~~

12. The exoskeleton as claimed in claim 11, wherein the at least two actuator arrays are arranged in an antagonistic pattern.

13. The exoskeleton as claimed in any one of claims 8 to 12, wherein the exoskeleton comprises a 2-degree-of-freedom shoulder exoskeleton.

14. The exoskeleton as claimed in any one of claims 8 to 12, wherein the exoskeleton comprises a lower body exoskeleton.

15. The exoskeleton as claimed in any one of claims 8 to 12, wherein the exoskeleton comprises a full body exoskeleton.

16. A method of generating a bending motion, the method comprising:

providing an actuator array comprising an elongate base and a plurality of pneumatic actuator elements removably attached to the elongate base, wherein the elongate base comprises a pliant and inextensible material;

supplying a pressurized fluid to inflate the pneumatic actuator elements such that adjacent pneumatic actuator elements interfere with each other to generate a bending motion, wherein the bending motion is supported by the elongate base; and

controlling at least one parameter associated with the pneumatic actuator elements to control a three-dimensional (3-D) profile of the bending motion.

17. The method as claimed in claim 16, wherein controlling at least one parameter comprises selecting relative sizes of adjacent pneumatic actuator elements.

18. The method as claimed in claim 16 or 17, wherein controlling at least one parameter comprises selecting shapes of adjacent pneumatic actuator elements.

19. The method as claimed in any one of claims 16 to 18, wherein controlling at least one parameter comprises selecting a spatial distribution of the pneumatic actuator elements on the elongate base.

20. The method as claimed in any one of claims 16 to 19, wherein controlling at least one parameter comprises selecting relative elasticities of adjacent pneumatic actuator elements.

21. The method as claimed in any one of claims 16 to 20, wherein supplying the pressurized fluid to inflate the pneumatic actuator elements comprises operating the pneumatic actuator elements independently of one another.

22. A method of mechanically assisting a joint of a user, comprising mounting an exoskeleton as claimed in any one of claims 8 to 15 to the user, and operating the at least one actuator array to generate the bending motion.

~~23. The method as claimed in claim 22, wherein operating the at least one actuator array comprises synchronising inflation of selected pneumatic actuator elements with a limb or body movement of the user to reduce a load on the user's muscles.~~

~~24. A garment article comprising:~~

~~at least one actuator array as claimed in any one of claims 1 to 7;~~

~~at least one sensor; and~~

~~a processor communicatively coupled to the at least one actuator array and the at least one sensor,~~

~~wherein the processor is configured to control the bending motion of the at least one actuator array based on an input from the at least one sensor.~~

~~25. The garment article as claimed in claim 24, comprising a set of fabric-based overalls.~~

~~26. The garment article as claimed in claim 24, comprising a pair of fabric-based shoulder sleeves.~~

1. An exoskeleton comprising:

a garment article wearable on a body of a user; and

a plurality of structurally independent actuator elements is mountable inside the garment article, with the structurally independent actuator elements being arranged in proximity to form a row array;

wherein, when the structurally independent actuator elements are pneumatically inflated, a structurally independent actuator element collides or presses against an adjacent structurally independent actuator element at an elemental contact area to produce an elemental resistive force or torque, which sums up to support body muscles of the user.

2. The exoskeleton according to claim 1, further comprising another row array of structurally independent actuator elements, wherein the two row arrays are configured in a parallel arrangement.

3, The exoskeleton according to claim 1 or 2, wherein each structurally independent actuator element is detachable or replaceable.

4. The exoskeleton according to claim 3, wherein the elemental resistive force or torque output is controllable by changing a shape, a size, a material elasticity or a spatial location, or any combination thereof, of a replaceable structurally independent actuator element.

5. The exoskeleton according to claim 3, wherein a fit of the exoskeleton is adaptable to a topology of the user body by changing a shape, a size, a material elasticity or a spatial location, or any combination thereof, of a replaceable structurally independent actuator element.

6. The exoskeleton according to any one of the preceding claims, wherein the structurally independent actuator elements are independently inflatable.

7. The exoskeleton according to any one of the preceding claims, wherein elemental contact areas of the structurally independent actuator elements are able to translate, rotate or reposition, thereby allowing minimal mechanical resistance to rotation of the body of the user.