CLAIMS

1. A device for skin bioprinting comprising:

a dispenser module configured to actuate and dispense a bioink from a first chamber, and to actuate and dispense a crosslinker from a second chamber;

a storage module coupled to the dispenser module, the storage module comprising the first chamber for storing the bioink and the second chamber for storing the crosslinker;

a mixing module coupled to the storage module for mixing the bioink and the crosslinker dispensed from the first and second chambers respectively; and

a rotatable applicator coupled to the mixing module for rotatably applying a mixture of the bioink and crosslinker from the mixing module onto a surface of a patient in need of skin regeneration,

wherein the rotatable applicator comprises a rollerball configured to roll along the surface of the patient in need of skin regeneration.

2. The device of claim 1, further comprising a cooling module configured to contain cooling elements for cooling the bioink, the cooling being to prevent premature gelation of the bioink.

3. The device of claim 2, wherein the cooling module is arranged to be adjacent or at least partially surrounding the mixing module such that when in use, the cooling elements contained therein are capable of cooling the mixture of the bioink and crosslinker.

4. The device of claim 1, wherein the dispenser module comprises a first piston configured to displace within the first chamber to dispense the

bioink from the first chamber and a second piston configured to displace within the second chamber and dispense the crosslinker from the second chamber.

5. The device of claim 4, wherein the dispenser module further comprises one or more pneumatic inlets configured to introduce gas for actuating the first and/or second pistons.

6. The device of claim 4, wherein the dispenser module further comprises a plunger coupled to the first and the second pistons.

7. The device of claim 1, wherein the mixing module comprises a static mixer.

8. The device of claim 1, further comprising a control unit configured to control the dispensing of the bioink and the crosslinker from the first and second chambers respectively, to the mixing module.

9. The device of claim 8, wherein the control unit is further configured to control the mixing of the bioink and the crosslinker in the mixing module.

10. The device of claim 8, wherein the device further comprises an activation switch electrically coupled to the control unit for activating and/or deactivating the control unit.

11. The device of claim 5, wherein the device further comprises a pneumatic pump coupled to the one or more pneumatic inlets.

12. The device of claim 1, wherein the device is a handheld device.

13. The device of claim 1, wherein the storage module is detachably coupled to the dispenser assembly.

14. The device of claim 1, wherein the mixing module is detachably coupled to the storage module.

15. The device of claim 1, wherein the first chamber and the second chamber of the storage module are independently removable.

16. The device of claim 2, wherein the cooling module comprises the cooling elements.

17. The device of claim 16, wherein the cooling elements comprise phase change material.

18. A method of making a device for skin bioprinting, the method comprising:

providing a dispenser module configured to actuate and dispense a bioink from a first chamber, and to actuate and dispense a crosslinker from a second chamber;

providing a storage module that is coupled to the dispenser module, the storage module comprising the first chamber for storing the bioink and the second chamber for storing the crosslinker;

providing a mixing module that is coupled to the storage module for mixing the bioink and the crosslinker dispensed from the first and second chambers respectively; and

providing a rotatable applicator that is coupled to the mixing module for rotatably applying a mixture of the bioink and crosslinker from the mixing module onto a surface of a patient in need of skin regeneration, wherein the step of providing the rotatable applicator comprises providing a rollerball configured to roll along the surface of the patient in need of skin regeneration.