CLAIMS

1. A method of fabricating an interfacial structure, the interfacial structure comprising a substrate and a projection on the substrate, the method comprising the steps of:
   a) providing the substrate;
   b) creating a number of steps on a surface of the substrate; and
   c) fabricating the projection on the substrate by additive manufacturing onto the number of steps, thereby creating a stepped interfacial joint between the substrate and the projection, wherein the projection extends outwardly from the surface of the substrate.

2. The method of claim 1, wherein step b) comprises creating the number of steps as a recess on the surface of the substrate.

3. The method of claim 2, wherein step b) comprises creating the number of steps to fully surround the recess.

4. The method of claim 1, wherein step b) comprises creating the number of steps as a protrusion on the surface of the substrate.

5. The method of claim 4, wherein step b) comprises creating the number of steps to fully surround the ~~projection~~protrusion.

6. The method of any one of claims 1 to 5, wherein step b) comprises creating the number of steps by subtractive manufacturing.

7. The method of claim 6, wherein in step b), the number of steps are created by metal machining and wherein in step c), the projection is created by laser metal deposition.

8. The method of any one of ~~the preceding~~ claims 1 to 7, wherein step a) comprises fabricating the substrate by additive manufacturing.

9. The method of claim 8 when dependent on any one of claims 1 to 5, wherein step b) comprises creating the number of steps during additive manufacturing fabrication of the substrate.

10. The method of any one of ~~the preceding~~ claims 1 to 9, wherein the stepped interfacial joint comprises a metallurgical bond.

11. The method of any one of ~~the preceding~~ claims 1 to 10, wherein each of the number of steps comprises a sideways-facing surface and an upwards-facing surface when the surface of the substrate is facing up, wherein step a) comprises creating each sideways-facing surface to be at an angle θ from the vertical and creating each upwards-facing surface to be at an angle α from the horizontal, and wherein θ and α each ranges from 0° to 80°.

12. The method of claim 11, wherein step a) comprises creating a fillet between at least one upwards-facing surface and one sideways-facing surface.

13. The method of claim 11 or 12, wherein step a) comprises creating a chamfer between at least one sideways-facing surface and one upwards-facing surface.

14. The method of any one of ~~the preceding~~ claims 1 to 13, wherein step b) comprises fabricating a thin-walled solid body of the projection onto the number of steps.

15. The method of any one of claims 1 to 14, wherein step b) comprises fabricating a non-hollow portion of the projection onto the number of steps.

16. A fabricated interfacial structure comprising:

a substrate having a number of steps created on a surface of the substrate;

a projection fabricated by additive manufacturing onto the number of steps; and

a stepped interfacial joint between the substrate and the projection,

wherein the projection extends outwardly from the surface of the substrate.

17. The fabricated interfacial structure of claim 16, wherein the number of steps are created as a recess on the surface of the substrate.

18. The fabricated interfacial structure of claim 17, wherein the number of steps fully surround the recess.

19. The fabricated interfacial structure of claim 16, wherein the number of steps are created as a protrusion on the surface of the substrate.

20. The fabricated interfacial structure of claim 19, wherein the number of steps fully surround the protrusion.

21. The fabricated interfacial structure of any one of claims 16 to 20, wherein the stepped interfacial joint comprises a metallurgical bond.

22. The fabricated interfacial structure of any one of claims 16 to 21, wherein each of the number of steps comprises a sideways-facing surface and an upwards-facing surface when the surface of the substrate is facing up, wherein each sideways-facing surface is at an angle θ from the vertical and each upwards-facing surface is at an angle α from the horizontal, and wherein θ and α each ranges from 0° to 80°.

23. The fabricated interfacial structure of any one of claims 16 to 22, wherein the projection comprises a thin-walled solid body fabricated onto the number of steps.

24. The fabricated interfacial structure of any of claims 16 to 22, wherein the projection comprises a non-hollow solid body fabricated onto the number of steps.