Claims:

1. A micro-climate control system, comprising:

a fan assembly; and

a thermoelectric system integrated with the fan assembly and being operable to actively cool or heat air as the air passes through the fan assembly, the thermoelectric system comprising:

a thermoelectric heat pump;

a heat reject subsystem comprising a first radial heat exchanger; and

a heat accept subsystem comprising a second radial heat exchanger;

wherein the fan assembly is operable to:

draw air from a space to be conditioned;

output conditioned air passed through one of the heat reject subsystem and the heat accept subsystem to the space to be conditioned; and

output air passed through the other one of the heat reject subsystem and the heat accept subsystem away from the space to be conditioned.

2. The micro-climate control system of claim 1 wherein:

the thermoelectric system is operable to cool the space to be conditioned;

the fan assembly is operable to output the conditioned air passed through the heat accept subsystem to the space to be conditioned; and

the fan assembly is operable to output the air passed through the heat reject subsystem away from the space to be conditioned.

3. The micro-climate control system of claim 1 wherein:

the thermoelectric system is operable to heat the space to be conditioned;

the fan assembly is operable to output the conditioned air passed through the heat reject subsystem to the space to be conditioned; and

the fan assembly is operable to output the air passed through the heat accept subsystem away from the space to be conditioned.

4. The micro-climate control system of claim 1 further comprising a shroud placed around the heat reject subsystem and the heat accept subsystem which separates the conditioned and reject airflow from each other and directs each airflow.

5. The micro-climate control system of claim 4 wherein the shroud directs the reject airflow upwards and directs the conditioned airflow downwards such that the system could be mounted horizontally such as in a ceiling.

6. The micro-climate control system of claim 5 wherein there is unused space above the ceiling where the reject air can accumulate.

7. The micro-climate control system of claim 1 wherein the fan assembly comprises a plurality of blades.

8. The micro-climate control system of claim 7 wherein the fan assembly further comprises a housing, wherein the heat pump is comprised in the housing.

9. The micro-climate control system of claim 1 wherein:

the fan assembly is an impeller-based fan assembly comprising a plurality of rotating discs that operate as impellers that draw air and then propel the air radially outward from the plurality of rotating discs.

10. The micro-climate control system of claim 9 wherein outer edges of the plurality of rotating discs are structured to direct the air that is propelled radially outward from the plurality of rotating discs at a downward angle.

11. The micro-climate control system of claim 1 wherein:

the fan assembly is a centrifugal fan assembly comprising a plurality of vertical impellers, an air inlet, and an air outlet, the plurality of vertical impellers operable to rotate around the air inlet to draw the air into the air inlet and blow the air out of the air outlet.

12. The micro-climate control system of claim 1 wherein the thermoelectric heat pump comprises:

a surround and spacer (SAS) structure comprising a wall defining a first open side and a second open side;

an interconnect board enclosed within the SAS structure, the interconnect board comprising one or more openings from a first surface of the interconnect board to a second surface of the interconnect board, the one or more openings defining locations at which a plurality of thermoelectric modules are to be mounted on the interconnect board;

the plurality of thermoelectric modules mounted on the interconnect board at the locations defined by the one or more openings, each thermoelectric module of the plurality of thermoelectric modules having a first side and a second side;

a hot-side heat spreader that is in thermal contact with the first side of each thermoelectric module of the plurality of thermoelectric modules; and

a cold-side heat spreader that is in thermal contact with the second side of each thermoelectric module of the plurality of thermoelectric modules;

wherein a periphery of the hot-side heat spreader mechanically contacts the wall of the SAS structure at the first open side, and a periphery of the cold-side heat spreader mechanically contacts the wall of the SAS structure at the second open side such that a compression force applied to the heat pump is absorbed by the SAS structure.

13. The micro-climate control system of claim 12 wherein the thermoelectric heat pump further comprises an environmental seal located where the periphery of the hot-side heat spreader mechanically contacts the wall of the SAS structure and where the periphery of the cold-side heat spreader mechanically contacts the wall of the SAS structure.

14. The micro-climate control system of claim 12 wherein a thickness of the wall of the SAS structure is such that a thermal short between the hot-side heat spreader and the cold-side heat spreader is mitigated while providing sufficient strength to withstand at least a predefined amount of a compression force applied to the heat pump.

15. A micro-climate control system, comprising:

a fan assembly;

a thermoelectric system integrated with the fan assembly and being operable to actively cool or heat air as the air passes through the fan assembly, the thermoelectric system comprising:

a thermoelectric heat pump;

a heat reject subsystem; and

a heat accept subsystem;

wherein the fan assembly is operable to:

draw air from a space to be conditioned;

output conditioned air passed through one of the heat reject subsystem and the heat accept subsystem to the space to be conditioned; and

output air passed through the other one of the heat reject subsystem and the heat accept subsystem away from the space to be conditioned; and

a shroud placed around the heat reject subsystem and the heat accept subsystem which separates the conditioned and reject airflow from each other and directs each airflow.

16. A micro-climate control system, comprising:

a fan assembly; and

a thermoelectric system integrated with the fan assembly and being operable to actively cool or heat air as the air passes through the fan assembly, the thermoelectric system comprising:

a thermoelectric heat pump;

a heat reject subsystem; and

a heat accept subsystem;

wherein the fan assembly is operable to:

draw air from a space to be conditioned;

output conditioned air passed through one of the heat reject subsystem and the heat accept subsystem to the space to be conditioned; and

output air passed through the other one of the heat reject subsystem and the heat accept subsystem away from the space to be conditioned; and

wherein the thermoelectric heat pump comprises:

a surround and spacer (SAS) structure comprising a wall defining a first open side and a second open side;

an interconnect board enclosed within the SAS structure, the interconnect board comprising one or more openings from a first surface of the interconnect board to a second surface of the interconnect board, the one or more openings defining locations at which a plurality of thermoelectric modules are to be mounted on the interconnect board;

the plurality of thermoelectric modules mounted on the interconnect board at the locations defined by the one or more openings, each thermoelectric module of the plurality of thermoelectric modules having a first side and a second side;

a hot-side heat spreader that is in thermal contact with the first side of each thermoelectric module of the plurality of thermoelectric modules; and

a cold-side heat spreader that is in thermal contact with the second side of each thermoelectric module of the plurality of thermoelectric modules;

wherein a periphery of the hot-side heat spreader mechanically contacts the wall of the SAS structure at the first open side, and a periphery of the cold-side heat spreader mechanically contacts the wall of the SAS structure at the second open side such that a compression force applied to the heat pump is absorbed by the SAS structure.