A lithographically patterned mechanical design can be included to absorb the deformation strain in the conductive thin film while retaining high conductivity. It can be stretched and contracted back to its original form, allowing its usage as a geometrically and spatially tunable thermal patch on various pain locations. Web and battery integration can be included to make it a completely autonomous-mobile low-cost (for example, $1-2) smart electronic system, with precise temperature control using smartphones or mobile gadgets.

[0004] In an ~~embodiment~~ aspect a thermal patch is provided, comprising: an array of heating pads; and a plurality of stretchable conductors interconnecting each of the array of heating pads with adjacent heating pads. In any one or more aspects or embodiments the array of heating pads can be interconnected between a plurality of contact pads. The plurality of contact pads can be connected to adjacent heating pads by stretchable conductors. The thermal patch can include or be connected to a battery. The thermal patch can include or be connected to a flexible microcontroller. The thermal patch can include or be connected to a wireless transceiver configured to communicate with a mobile computing device. The wireless transceiver can be a Bluetooth transceiver. The mobile computing device can be a smart phone.

[0005] In another ~~embodiment~~aspect, a method is provided, comprising: a) forming a mask on a polymer layer, the mask defining a thermal patch; b) etching the polymer layer; c) depositing a conductive material to form stretchable conductors of the thermal patch; and d) vapor phase etching to release the thermal patch. In any one or more aspects or embodiments, the mask can be an aluminum mask. The polymer layer can be a polyimide (PI) layer. The conductive material can be a metal, preferably copper, nickel, chromium, tin, silver, platinum or a metal alloy. The method can include wet etching to remove the mask prior to depositing the conductive material. The method can include depositing a seed layer for depositing the conductive material. The vapor phase etching can be XeF_2 vapor phase etching. In any one or more of the various embodiments the stretchable conductor(s) can have a lateral spring design. The design of the conductors can make