Flexible and Stretchable Radiofrequency Coils for Improved Magnetic Resonance Imaging

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## Flexible and Stretchable Radiofrequency Coils for Improved Magnetic Resonance Imaging

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<th>Technology Overview</th>
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<td>• MRI uses radiofrequency (RF) coils to obtain images of internal anatomy</td>
<td>• <strong>The Technology</strong>: The inventors have developed a stretchable and autotuning RF coil array for MRI</td>
<td>Eliza Motovilova</td>
<td>PCT Application Filed</td>
<td>Motovilova et al. Sci Rep. 2021.</td>
<td>Louise Sarup (646) 962-3523 <a href="mailto:lss248@cornell.edu">lss248@cornell.edu</a></td>
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<td>• Current MRI techniques use rigid RF coil arrays to accommodate a wide range of patient anatomies</td>
<td>• In this RF coil, liquid metal is embedded in a soft polymer, which allows it to conform to a variety of patient shapes</td>
<td>Simone A. Winkler</td>
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<td>• Arrays that better conform to the anatomy of interest yield better signal-to-noise ratio (SNR)</td>
<td>• The design of the proposed coil includes a stretchable interdigital capacitor, which reduces resonance frequency shift with stretching</td>
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<td>• While newer, flexible RF designs improve this volume issue, full SNR optimization requires that RF coils be stretchable</td>
<td>• <strong>PoC Data</strong>: In bench measurements, the proposed coil had a frequency shift of only 0.4% at 27% stretch, compared to the control coil at 4%</td>
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<td>• Current efforts for stretchable RF coils suffer from detuning during stretching or require outside circuitry to retune coils</td>
<td>• In vivo, the proposed coil showed a 60% SNR increase compared to a dedicated knee coil array</td>
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<td>• <strong>Unmet Need</strong>: RF coils which are both stretchable and flexible to conform to patient anatomy and are automatically tunable</td>
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![Weill Cornell Medicine logo](logo.jpg)
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Technology Applications

- General MR imaging with increased resolution
- More effective MRI for challenging anatomies
- Wearable MRI technology

Technology Advantages

- Design provides higher SNR for better imaging
- Flexible and stretchable design can be worn by patient and conform to a variety of anatomies
- Coils are autotuning, so there is no need for external tuning circuits or equipment

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Supporting Data / Figures

Figure 1: Top: Schematic of RF coil in stretchable polymer Bottom: Experimental and simulated change in resonance frequency with stretching is reduced in proposed design.
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Supporting Data / Figures

Figure 2: Prototype of proposed RF coil shows higher SNR compared to a commercial knee coil array.