

## **RESEARCH COCHLEAR IMPLANT FOR SMALL LABORATORY ANIMALS**

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Studies of the neural changes induced by cochlear implantation depend upon the availability of a flexible and low-cost animal model. A fully implantable cochlear stimulator, suitable for rats and mice, was recently developed in-house to address this need. This design has been extended to include multiple channels, adjustable currents, and remote adjustment of stimulation parameters. Power is provided inductively, with three orthogonal sets of coils surrounding the animal's enclosure coupling to a smaller coil situated on the implant. This arrangement provides for continuous power, irrespective of animal position. Communication with the implant is achieved via a 2.4 GHz radio link. A series of switches generate two channels of current-regulated biphasic stimulation, delivered to the cochlea via a two/three ringed electrode array. The implant utilises inexpensive off-the-shelf parts, and can be fabricated in a modestly equipped workshop. The resulting implant will be used in a variety of physiological, anatomical and behavioural studies, providing valuable insights for the development of next-generation implants and speech processing strategies. Such studies will also guide clinicians, especially with respect to the roles of plasticity and sensitive periods in predicting outcomes.