

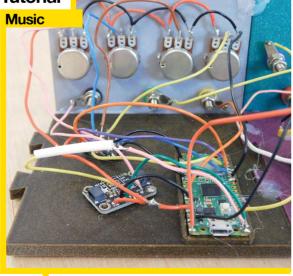




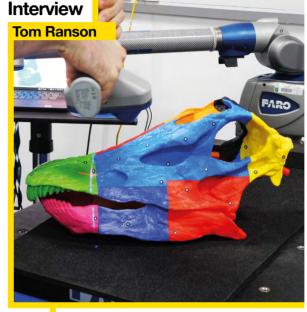
LENS 17

- 18 **Ultimate Workshop** Get the most out of your space
- 28 How I Made: RF Analyser The ultimate portable radio workstation
- 34 Interview: Tom Ranson Scanning animals under a museum
- 42 Objet 3d'art Print-in-place (nearly) waterproof boxes
- 44 Letters Crouch, pause, touch, engage

Tutorial



What on earth could this jumble of wires be doing?



34

48

Bringing the Natural History Museum's awesome collection to you, wherever you are

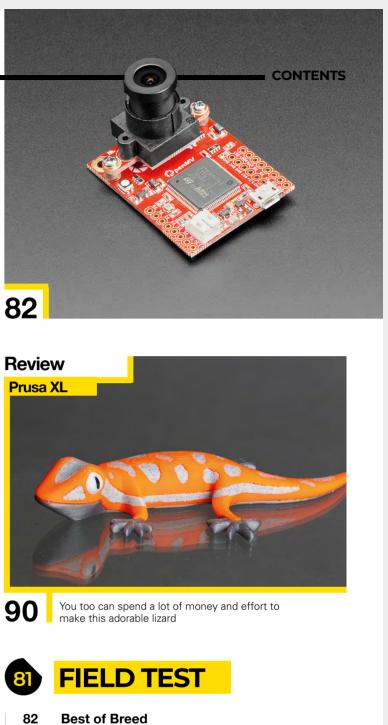




- Like sewing, but with skin
- Tutorial Mecanum Robot 52 Forwards, backwards, sideways
- 56 Tutorial Smart motor Strap an RP2040 directly to a stepper motor
- 62 Tutorial Make noise Carefully crafted waves with Raspberry Pi Pico
- 68 Tutorial I've got the power Ditch the sockets – get your electrons from batteries
- 74 **Tutorial** Colour printing Create beautiful pictures with your 3D printer

Some of the tools and techniques shown in HackSpace Magazine are dangerous unless used with skill, experience and appropriate personal protection equipment. While we attempt to guide the reader, ultimately you are responsible for your own safety and understanding the limits of yourself and your equipment. HackSpace Magazine is intended for an adult audience and some projects may be dangerous for children. Raspberry Pi Ltd does not accept responsibility for any injuries, damage to equipment, or costs incurred from projects, tutorials or suggestions in HackSpace Magazine. Laws and regulations covering many of the topics in Price does not accept responsibility for any injurites, damage to equipment, or costs information projects, utorials or suggestions in HackSpace Magazine activity in any injurites, damage to equipment, or costs information projects, utorials or suggestions in HackSpace Magazine activity in your jurisdiction and ensuring that you comply with them. Some manufacturers place limits on the use of their hardware which some projects or suggestions in HackSpace Magazine may go beyond. It is your responsibility to understand the manufacturer's limits. HackSpace magazine is published monthly by Raspberry Pi Ltd, 194 Cambridge Science Park, Milton Road, Cambridge, England, CB4 0AB, United Kingdom. Publishers Service Associates, 2406 Reach Road, Williamsport, PA, 17701, is the mailing agent for copies distributed in the US and Canada. Application to mail at Periodicals prices is pending at Williamsport, PA. Postmaster please send address changes to HackSpace magazine c/o Publishers Service Associates, 2406 Reach Road, Williamsport, PA, 17701.

62



- Machine learning development boards
- 88 Review xTool S1 Squeezing a lot of lasers into a small box
- 90 Review Prusa XL The most unusual 3D printer released in years
- 96 Crowdfunding BullseyeBore and Print-a-Kit How much?!