



TE PAPA
OUR PLACE



AN EXHIBITION DEVELOPED BY **TE PAPA** WITH **WETA WORKSHOP**



TE PAPA AND WETA WORKSHOP
PRESENT A SCIENCE EXHIBITION
LIKE NO OTHER



WHAT IF THE PLANET'S SMALLEST GENIUSES COULD SHARE THEIR BIGGEST SECRETS?

Bug Lab is a science exhibition like no other, presented not by humans but by the incredible bugs themselves.

Enter the bugs' world, marvel at their talents, and witness them in action. Meet the greatest of these micro masters and face their most fiendish tests. Can you fathom the dragonfly's speed, beat the mantis' reflexes, or defeat the giant hornet with your friends and family?

The bugs' biggest challenge to us is to learn from their genius. Precision flight, swarm intelligence, mind control ... bugs did it all first, and they're still doing it better. What would the future look like if we could match their brilliance?



A BOLD, CINEMATIC AND IMMERSIVE EXPERIENCE

In our media-saturated environment, museums must stand shoulder to shoulder with blockbuster films and virtual reality to capture imaginations and inspire learning.

Weta Workshop's Academy Award-winning creative vision and Te Papa's interpretive expertise have pushed *Bug Lab* far beyond the realm of your regular natural history exhibition, and will change the way you think about the world beneath your feet.

- ▶ Marvel at ultra-detailed, large-scale models of bugs.
- ▶ Experience the world as bugs do through immersive, sensory experiences.
- ▶ Explore cutting-edge science.

TRANSFORMING TREPIDATION TO AWE AND INSPIRATION

AUDIENCE GOALS

- ▶ Feel awe for bugs and the natural world through dramatic encounters with their adaptive genius.
- ▶ Test your abilities against those of bugs, and experience the world as they do.
- ▶ Understand that bug traits have developed over millions of years through adaptation to selection pressures.
- ▶ Discover how humans are applying bug genius to solve complex problems, and imagine what's possible in the future.

TARGET AUDIENCES

- ▶ Multi-generational families: Explore, discover, and learn together.
- ▶ Educators and learners: Experience STEM education like never before, and discover bug-inspired technologies, including swarm intelligence and nanotechnology.
- ▶ Millennials: Encounter an immersive world inspired by movies, sci fi, and pop culture.





EXHIBITION OVERVIEW

EXHIBITION STRUCTURE

IMMERSIVE BUG CHAMBERS

Encounter each large-scale, ultra-realistic bug in a uniquely themed chamber, posed in a dramatic moment that reflects its adaptive 'genius' and suffused in sound and light. A large-screen video on the exterior tells the bug's full story in high definition.

INTERACTIVE ADAPTATION STATIONS

Around each chamber, explore each bug's adaptive genius in more detail through physical interactives, audiovisuals, graphics, and text – and test your abilities against theirs.

HANDS-ON LABS

Dig deeper into cutting-edge bug science and bio-inspiration through hands-on activities.



EXPLORE THE EXHIBITION





ORCHID MANTIS

HYMENOPUS CORONATUS

FAIREST AND DEADLIEST OF THEM ALL

GENIUS OF DISPLAY

The bug world is teeming with dirty tricks. The orchid mantis is so attractive to pollinators that it doesn't need to hunt – dinner comes right to it!

The insect's shape is impressive, but its real secret lies in its colour, which its prey see as even better than a real flower. The mantis waits patiently for a chance to snatch food from the air using its super-fast kung fu reflexes.

EXPERIENCE: SECRET GARDEN

Encounter a large-scale model of the orchid mantis, blending into a garden of luscious flowers. Changing light effects show how it is perceived by its prey, and why its 'advertising' is so irresistible to its hapless 'target audience'. Snap!





JAPANESE HONEY BEES

APIS CERANA JAPONICA

COOPERATIVE COMRADES

GENIUS OF SWARMS

Japanese honeybees work together to defeat an otherwise unbeatable enemy many times their size – the marauding hornet.

To do this, they've adapted a behaviour used to warm their hive: disengaging their wings and vibrating their muscles. When a hornet threatens the nest, they smother it, raising its temperature to a level that the bees can just stand but the hornet cannot.

EXPERIENCE: HEAT UP THE HIVE

Scramble – the bees need your help! Work together to defend the hive by generating 'heat' through movement. Reach the target temperature to overcome the hornet.





DRAGONFLY *PROCORDULIA SMITHII* **FLYING ACE**

GENIUS OF FLIGHT

The dragonfly is built for high performance and speed. To catch prey in mid-air, it uses its sharp eyesight and ability to perceive the world at 300 frames per second.

Its flight path means it won't be seen until it's too late. By finely controlling the movement of its robustly structured wings, it achieves a stunning strike rate of up to 97 percent!

EXPERIENCE: DRAGONFLY ZOETROPE

A huge, hypnotic zoetrope features a dragonfly in flight, with 3-D printed models performing spectacular manoeuvres. Cycles of movement are slowed to less than one beat per second, allowing you to observe exactly how dragonflies achieve their precise flight patterns.





JEWEL WASP

AMPULEX COMPRESSA

KILLER BRAIN SURGEON, DEVOTED MOM

GENIUS OF VENOM

Jewel wasp versus cockroach ... a zombie-horror story that plays out on the forest floor.

The jewel wasp's life cycle depends on its ability to perform intricate 'brain surgery' on a cockroach. With great precision and in a tight timeframe, it injects venom into the roach's thorax and brain, turning it into a zombie. It then leads it back to its burrow to lay its eggs inside it. That's one devoted mom ...

EXPERIENCE: OPERATING THEATRE

Witness the iridescent jewel wasp at work. Two large-scale models are locked in a dramatic moment. Light illustrates the path of the venom through the roach's system. Glowing, graphic-novel-style panels illustrate the fuller story.





BOMBARDIER BEETLE * PĀPAPA TAIPAPA
Master with an exoskeleton

- Supreme defender that blasts its enemies with boiling hot spray and its rear end
- Instantly mixes explosive chemicals in its rear combustion chamber
- Flies to almost any direction, at a rate of hundreds of pulses a second
- Protects itself from the blast with a super-tough exoskeleton

**EXPERIENCE:
SLIDE-THROUGH
BEETLE**

Younger visitors, explore a model bombardier in firing pose, and slide through its abdomen with 'explosive' speed!

Also featuring ...

BOMBARDIER BEETLE

STENAPTINUS INSIGNIS

BLASTER BEETLE

GENIUS OF EXOSKELETONS

Pick on the bombardier beetle and you're in for a nasty surprise. This unassuming insect hides a dazzling defence system in its rear end.

When threatened, it blasts its attacker with a boiling hot spray. It does this by rapidly combining 'rocket fuel' (hydrogen peroxide) with a catalyst, sending the aggressor scuttling for cover. The bombardier's tough cuticle – the basis of its exoskeleton – insulates it from the blast.



**EXPERIENCE: SILK
SPECTACULAR**

The katipō perches above the silk lab – a perfect opportunity for a spider selfie! Discover the wonders of silk – from elasticity, to toughness, to biodegradability – and explore how this incredible material might be used in cutting-edge medicine and technology.

KATIPŌ SPIDER

LATRODECTUS KATIPO

SUPERB SPINNER

GENIUS OF SILK

The katipō is a member of the black-widow family, which comprises some of the most venomous spiders in the world. Like all spiders, it's a masterful '3-D printer' of silk. It uses this incredible fibre to build egg sacs, spin traps, and even disperse its young via silken 'parachutes'.



HANDS-ON LABS

DIVE DEEPER INTO CUTTING-EDGE BUG SCIENCE AND BIO-INSPIRATION THROUGH HANDS-ON ACTIVITIES.



THE LAB

- ▶ Explore the 'bug basics' of these adaptations.
- ▶ Investigate relevant bug-inspired technologies – from nanostructures to robotics, synthetic silk to swarm intelligence.
- ▶ 'Meet' scientists through video interactives, and find out how they're making new discoveries about bugs.
- ▶ See real bug specimens.
- ▶ Young visitors, get making and exploring through inquiry-based activities.



DEBATE SPACE

Have your say! Should we eat bugs? Wipe out the world's mosquitos? Do any bugs deserve more love? Think again about the 'creepy-crawlies' in your life, and how they might help us all.

INDIGENOUS PERSPECTIVE

Explore the insect world and life cycles through the eyes of New Zealand Māori, and hear their stories of inspiration and learning from these 'little things with a big impact'.



BUG LAB TEAM

TE PAPA

Content, interpretive expertise, and design skills were provided by Te Papa. Our subject expert, Dr Phil Sirvid, was supported by spider biologist and writer Dr Simon Pollard. They worked with entomological educator Ruud Kleinpaste and an international panel of scientific advisors to incorporate the latest science from a wide range of fields.

BLOCKBUSTER EXHIBITIONS FROM A WORLD-LEADING MUSEUM

Te Papa is New Zealand's groundbreaking national museum, renowned for being interdisciplinary, participatory, bicultural, and fun. In 2015, it attracted 1.8 million visitors to its exhibitions – that's nearly half the country's population – and its satisfaction ratings are second to none.

WETA WORKSHOP

Weta Workshop's team is headed by Academy Award-winning Sir Richard Taylor as Creative Director. Around the *Bug Lab* table were many of the creative thinkers and artists who collaborated with Te Papa on *Gallipoli: The scale of our war* – our most successful exhibition ever.



EXHIBITION SPECIFICATIONS

SIZE

7,500–8,000 square feet (700–750 square metres)
– size flexible

LANGUAGE

English, with provision for a second language
if venues require

EXHIBITION LAYOUT

Modular in design, travels with all components

VENUE CONTENT

Venues are encouraged to add local content,
including live bugs

ENVIRONMENTAL REQUIREMENTS

Flexible, non-environmentally controlled option available

SUPPORT

Education resource
Copyright-cleared media and marketing materials
Experienced Te Papa installation and deinstallation team

PHOTO CREDITS

Pages 11, 21: Katipō spider by Tom While, Crown Copyright:
Department of Conservation Te Papa Atawhai (2008).

Page 10: Orchid mantis by Frupus

Page 10: Japanese giant hornet by T-mizo

Page 11: Bombardier beetle copyright (1999) National Academy of Sciences,
U.S.A - PNAS Spray aiming in the bombardier beetle:
Photographic evidence - Thomas Eisner AND Daniel J. Aneshansley
Jewel wasp by Johan J. Ingles-Le Nobel, extreme-macro.co.uk.

Page 25: Pūriri moth by Phil Bendle

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FOR MORE INFORMATION, CONTACT

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**Absolutely
Positively
Wellington**
New Zealand

**WETA
WORKSHOP**



This exhibition was made possible through
the support of the Wellington City Council

This exhibition has been developed by the Museum of New Zealand
Te Papa Tongarewa with Weta Workshop Limited

The background is a deep black space filled with numerous stars of varying sizes and colors, including white, yellow, orange, and blue. Some stars are accompanied by thin, curved white streaks, suggesting motion or light trails. The overall effect is a rich, multi-colored star field.

SEE THE WORLD THE BUGS BUILT