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Panama's wealth of insect biodiversity, makes it possible for researchers to compare the behavior of many different bee species. In this photo STRI staff scientist David Roubik interacts with a *Melipona triplaris* nest. Credit: STRI

In 1964 biologist William Hamilton introduced Inclusive Fitness Theory to predict and explain phenomena ranging from animal behavior to patterns of gene expression. With its many successes, the theory became a cornerstone for modern biology. In August, 2010, Harvard researchers [challenged the theory](#) in the prestigious journal, *Nature*. Now *Nature* has published sharp rebuttals from scores of scientists, including Edward Allen Herre and William Wcislo, staff scientists at the Smithsonian Tropical Research Institute.

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"[Bees](#) are probably the most useful group for studying why eusocial organisms have workers that do not reproduce, but the authors got a lot of their basic facts about bees wrong. For example, the authors argue that having defensible nests is the most important consideration for eusociality, but they ignore the fact that there are thousands of nest making animals that are not eusocial," said Wcislo, a specialist in the biology of bees. "What really caught my attention was that they completely misrepresented results of one of my own studies. This is very poor scholarship that does not support their case at all."

Says co-author, Edward Allen Herre, "Challenging existing paradigms is an essential part of a healthy scientific process. However, the burden is on the challengers to present a better alternative, particularly when a paradigm has been as successful as Inclusive Fitness has been. Both the factual and theoretical basis of the case for their proposed alternatives falls apart with even mild scrutiny. They simply do not make their case. But their challenge is still useful because crucial parts of the theory come out stronger for having been tested, and researchers can better see where more studies are needed."

The Smithsonian has recently established formal collaborations with Arizona State University to study [social insects](#) and the phenomenon of eusociality. Researchers expect that this collaboration will produce studies with a direct bearing on the issues raised in this debate.

Provided by Smithsonian Tropical Research Institute

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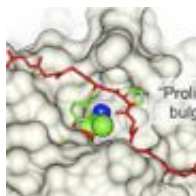


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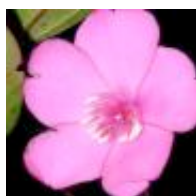


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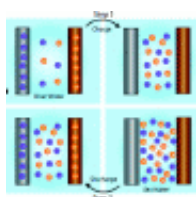


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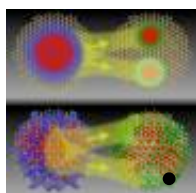
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