Dr Derek Mitchell researches into the heat transfer of man-made and natural honeybee nests at the School of Mechanical Engineering of the University of Leeds where he recently completed his Phd with a thesis entitled “The Thermofluid engineering of the honeybee nest (Apis Mellifera) . He has had articles published in Beecraft, Bee Culture, American Bee Journal and Natural Honey bee husbandry in addition to his published academic work in the Royal Society Journal and International Journal of Biometeorology .

Derek’s curiosity about this area of honey bees and heat started when Elaine, his wife, bought their first hive in 2010 and his physics and engineering training, told him what they had been told about honey bees and the hives wasn’t the complete story. This curiosity has resulted in his ground breaking and often controversial research into honey bees.

Some of which has been cited by Prof. Thomas D. Seeley, the foremost authority on honey bee ecology, as the “Best source of information on about the differences in insulation value between tree cavities and standard wooden hives and about the effects of these differences on the energetics of colony thermoregulation”. Seeley has included Derek’s research in his latest book “The Lives of Bees: the Untold Story of the Honey Bee in the Wild”

Professor Adam Hart, an entomologist from the University of Gloucestershire who co-presented BBC2’s Series Hive Alive about honeybees said “This research is fascinating – winter losses have become a feature of beekeeping and hive design could be a simple way to help honeybees. It is amazing to think that a practice adopted in the War to save wood might be contributing to the losses that beekeepers experience”.

The research apart from publications has also led to speaking to not only academic conference but to Beekeeping groups including: Apimondia 2019, National Honey show, BBKA Spring conventions and over 60 local beekeeping associations.

Publications:

Mitchell, D.M. (2024). *Are Man-Made Hives valid thermal surrogates for natural Honey Bee nests [in review] Journal of Thermal Biology*.

Mitchell D (2023) *Honeybees cluster together when it’s cold – but we’ve been completely wrong about why* The Conversation November 24, 2023 https://theconversation.com/honeybees-cluster-together-when-its-cold-but-weve-been-completely-wrong-about-why-218066

Mitchell, D.M. (2023) *Honey Bee Cluster – not insulation but stressful heat sink Journal of the Royal Society Interface.*

Mitchell, D.(2022) Honey bee (Apis mellifera) size determines colony heat transfer when brood covering or distributed,” Int. J. Biometeorol., vol. Accepted for publication.

Mitchell, D. (2019). Thermal efficiency extends distance and variety for honey bee foragers: Analysis of the energetics of nectar collection and dessication by Apis mellifera. Journal of the Royal Society, Interface, 16(20180879). https://doi.org/10.1098/rsif.2018.0879

Mitchell, D. (2019). Thermal Efficiency. Bee Culture, (April), 61–63.

Mitchell, D. (2019). To save honey bees we need to design them new hives The Conversation September 9, https://theconversation.com/to-save-honey-bees-we-need-to-design-them-new-hives-121792

Mitchell, D. (2019). Nectar, Humidity, Honey bees (Apis mellifera) and Varroa in summer: A theoretical thermofluid analysis of the fate of water vapour from honey ripening and its implications on the control of Varroa destructor. Journal of the Royal Society, Interface, 22 May. https://doi.org/10.1098/rsif.2019.0048

Mitchell, D. (2017). The DerekM Board. BeeCraft, (July), 15–17.

Mitchell, D. (2017, April). Putting a Number on Natural. Natural Bee Husbandry, (3), 4–9.

Mitchell, D. (2017). Honey bee engineering: Top ventilation and top entrances. American Bee Journal, 157(8), 887–889.

Mitchell, D. (2016). Ratios of colony mass to thermal conductance of tree and man-made nest enclosures of Apis mellifera: implications for survival, clustering, humidity regulation and Varroa destructor. International Journal of Biometeorology, 60(5), 629–638. https://doi.org/10.1007/s00484-015-1057-z

Mitchell, D. (2016). Winter Stresses on Honey Bees. BeeCraft, (jan).