up the rockskipper to determine if power amplification was involved in this defensive response. Preliminary analysis of jumping forces revealed a significant difference in maximum horizontal forces between wet and dry substrates and no evidence for power amplification . This study serves as a field test for the new force plate and will yield information that furthers our understanding of defensive responses in amphibious fish.

Assessing Heat Resilience and Energy Allocation of Cryptic Coral Lineages in Palau

Shantelle Bartley, Carsten Grupstra, Matthew-James Bennett, Maikani Andres, Kirstin Meyer-Kaiser, Annabel Hughes, Aden Nagree, Sarah Davies

Coral bleaching can lead to colony starvation due to the loss of carbon sugars from the photosynthetic algal symbionts. Yet, some corals living in naturally high-temperature environments exhibit adaptations including increased energy stores that can facilitate survival during the nutritionally challenging conditions associated with bleaching. Semi-enclosed lagoon habitats in Palau's rock islands experience temperatures similar to those expected under future climate change; however, corals of the species Porites lobata that live in these lagoonal habitats experience less bleaching than adjacent colonies on cooler outer reef sites. Here, we identified three genetic distinct lineages (L1-L3) within these Palauan reefs and thermal challenge experimentsrevealed that the two lineages mainly inhabiting the warmer lagoonal reefs (L2 and L3) are more thermally tolerant than the lineage largely restricted to the cooler outer reefs (L1). We conducted a reciprocal transplant experiment and quantified host and symbiont energy reserves after 1 year to test if L2 and L3 exhibited increased energy stores. We found that transplantation did not significantly affect these energetic traits, and instead constitutive differences between the lineages were observed. Specifically, L2, but not L3, had higher energy stores than L1. These data suggest that these lineages are likely adapted to higher temperatures in distinct ways: increased energy reserves facilitate L2 survival in high-temperature environments, but L3 likely employs a different, yet undetermined, adaptive strategy.

Exploring Correlations Between Habitat Complexity and Biodiversity Through Quantitative Analysis

Dkaria Bascom

This project aimed to quantify data from live footage from dive sites in and around Hubbard Springs visited by our scientific divers. Three sites were selected. "Drop 180/181", "Sandy Drop 159", and Hubbard Springs, each with distinct bottom compositions. These substrates significantly influenced fish biodiversity. Our scientific divers characterized the presence of species using the following categories: some (< 1), few (2-10), many (11-99), and abundant (100+). Prompt reporting of data occurred after every dive, coupled with immediate processing and review of video footage upon surfacing. Results unveiled Hubbard Springs (nearly 100% natural reef with a 10 ft max relief) as the most biodiverse of the three sites and hosted species like goliath grouper, white fin remora, leopard toadfish, and mangrove snapper. Drop 180/181 (80% natural reef with a 2-foot max relief). This site featured species like white fin remora, black seabass, polkadot batfish, and sand perch. Conversely, Drop 159 (90% sandy bottom and approximately max ½ ft relief) exhibited the lowest presence of species among the visited sites. Drop 159 featured limited quantities of white fin remora and white grunt. Statistical analyses were conducted to understand the relationships between species diversity and habitat, showcasing the data from each site.

Paddling against the waves: how varying wavelength kinematics affect tomopteris locomotion

Nick Battista

The soft-bodied, midwater polychaete Tomopteris is an interesting swimmer. Not only do Tomopteris swim continuously throughout their life, they also perform two modes of locomotion simultaneously: metachronal paddling and bodily undulation. They have two rows of flexible parapodia positioned on opposite sides of its body, which beat out of phase to one another. Their metachronal paddling behavior occurs in concert with their lateral bodily undulation. A notable feature of their bodywave is that it moves in the direction of travel, unlike eels or smooth-bodied polychaetes who use a rearward-directed wave for forward swimming. In this work we used a computational fluid dynamics model to explore the effects of varying wavelength kinematics, morphology, and scale on tomopteris swimming performance.

How Does Squid Skin Shine? Investigating reflectins with D. pealeii structural color and iridescence

Eden Anne Bauer, Jennifer McCarthy-Taylor, Stephen Senft, Carrie Albertin, Roger Hanlon

Octopuses, squids and cuttlefish are noted for their complex neural networks, sensory capabilities, limb dexterity and flexibility, and highly dynamic camouflage abilities. Camouflage patterns are rapidly generated by manipulating pigment-containing organs called chromatophores in concert with white leucophores and iridescent, reflective iridophores, which house specialized proteins named reflectins. Reflectins can self-organize into a wide variety of intracellular structures, including spheres and Bragg stack-like plates, to produce white diffusion and tunable iridescence. We investigated how reflectin diversity contributes to structural colors in Doryteuthis pealeii, the longfin inshore squid. D. pealeii was chosen due to its sequenced genome, accessibility, translucent body, and simpler skin anatomy compared to octopus and cuttlefish. Phylogenetic approaches identify 17 candidate D. pealeii reflectin sequences. We employed in-situ hybridization chain reaction (HCR) for eight of these sequences in fixed D. pealeii adult tissue, hatchlings, and embryos. Additionally, we examined morphological development of iridescence in these animals using light microscopy. Preliminary HCR images illustrate overlapping but unique patterns of reflectin expression in surface layers of the eye, ink sac, arms, and mantle of late-stage embryos and hatchlings. These results provide insight into where, when, and how different reflectins are deployed in D. pealeii, informing ongoing efforts to understand fundamental mechanisms of coloration and camouflage in cephalopods.

Bone distribution in the avian humerus and its correlation with flight style

Stephanie Baumgart, Andrew Moore, Emma Schachner

In vertebrate powered fliers, the forelimbs are specialized to navigate low-density fluids (air) and resist the stress and strain of the flight stroke. With over 10,000 species occupying many ecological niches, birds provide a powerful system for exploring the relationship between bone structure and ecology, in both volant and non-volant taxa. Here we evaluate the relationship between internal structure and external shape of the humerus and how bone distribution specifically relates to flight style. Our taxonomic sampling incorporates birds across four orders of magnitude of body mass (8g–11300g) assigned to 28 orders and 51 families to determine how bone distribution changes with flight style. We used microCT data from 15 evenly spaced slices from each avian humerus; some taxa were also evaluated with functionally homologous slice locations compared against eight evenly spaced slices to investigate how slice selection method affects results. The data show that birds with continuous flapping have the largest variation in bone distribution, whereas soarers or short-burst fliers are clustered together in bone structure morphospace. Diving and swimming birds have a broad range in bone morphospace. These results indicate that bone distribution correlates with flight style in extant birds. Further exploration of bone distribution in vertebrate fliers will elucidate how both external and internal bone morphology is related to behavior, and may provide useful for interpreting the ecologies of fossil taxa.

Trophic discrimination of compound-specific stable isotopes in raptor nestlings

Anna Bautista, Devin Johnson, Michael Henderson, David Anderson, Cory Williams

Bulk stable isotope analysis (BSIA) of carbon and nitrogen has been commonly used for assessing trophic relationships among organisms in a wide variety of ecosystems. However, compound-specific stable isotope analysis of